Keeping curiosity honest.

Understanding Bias, Perception, and Scientific Integrity.

Why did I choose this quote?

- Because my curiosity brought me to the Hessdalen Project but my understanding of how the human mind works is keeping me honest.

- The human brain is a pattern addict.
  This is what kept us alive while being hunted by sabertooth tigers in the stone age. It is also a problem in objective data analysis.

- Because false positives, like seeing a threat in the bushes, was better than being eaten by a predator. So the brain “over-detected” things.

Examples:

- We see faces and shapes in clouds.
- We hear voices in static.
- We see movement in the darkness.
- We attribute meaning based on our experience.

This learned pattern is also a weak point in our field of work, where objective interpretation is the key for a data, not meaning based investigation.

It’s simply: “I’m biased. You’re biased. Let’s work with that.”

Our biggest error sources in field work are the following:

- ***Fatigue*** - when people are too tired to ask the relevant questions. And long time periods with nothing exciting happening, changes perception.
- ***Expectations*** - when people are forced to produce “results” no matter if they are correct or not.
- ***Emotional bias*** - because people want to believe in a narrative.
- ***Group narrative*** - people are social creatures and adapting to a certain narratives allows them to become part of a community.

Why this is important to know?

When we are aware of our own weak spots, it enables us to ask the right questions instead. Like when we look at video footage, or collected data from our instruments.

The data collected by instruments, is data.

But is data = truth? Is that truth = fact?

No. Because even instruments can lie to us. Because measurements can be false.

False positives = not failure but data to build upon.

Instruments can all be spoofed by various factors:

- Electromagnetic Interference (EMI)
- Static
- Environmental noise (audible, light, physical contamination like dust)
- Calibration shifts

Machines don’t remove bias. They relocate it. Into electronics.

Plus, we always have to consider ALL data, in order to understand the “full” picture. Just picking one dataset would be like peeking through a keyhole instead of opening the door in order to see what lies beyond.

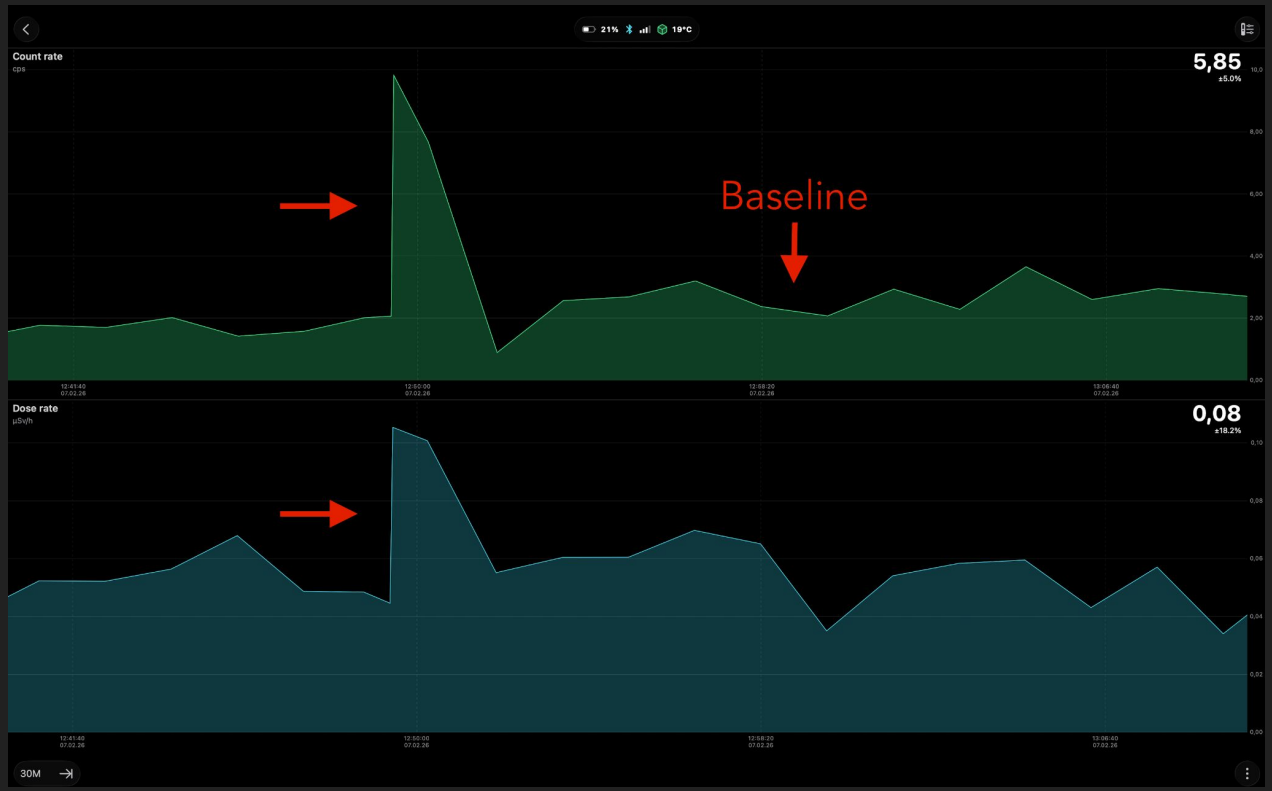
We must be data-driven. Not narrative-driven.

Example in Data

On the right we see a graph of a device (Radiacode 102) which measures radioactivity.
We see a sudden spike = increase and decrease in measured radiation. But what has caused this spike, we do not know, until we add more context.

(Sensor has been moved, radioactive source passed by the sensor, etc.)

A spike is a signal. It is not an explanation.



The danger of the narrative.

While we can all agree that each of us would certainly love to see something extraordinary, we have to also be aware that this fact alone, is also our biggest bias.

- Because that “WOW-moment” gives us instant gratification.
- Because seeing something extraordinary makes us feel special.
- Because mystery sells.
- Selling in form of social media currency = clicks, likes, interactions.

Why “Keeping curiosity honest” is so important.

So instead of just instantly jumping to a conclusion, I would like us to do the following:

- Ask “What else could it be?”
- Seek disconfirmation.
- Document uncertainty.
- Knowing the limitations of the equipment.
- Valuing the boring results (car lights, satellites, meteors, optical/digital artefacts, etc).
- And don’t be afraid to say “I don’t know.”

The Hessdalen Project - Staying curious the right way

In order for us to stay credible as a citizen science project, we need to:

- Question the narrative.
- Focus on the available data.
- Test and ensure that our instruments are functioning correctly.
- Resisting any hype.
- Protecting our integrity.

Curiosity is what keeps us engaged with such a complex problem set like the Hessdalen lights. And we are allowed to ask ridiculous questions as long as we don’t claim our *beliefs* to be true.

Thank you for your time.

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Now go out there and explore the world around you with an open mind.

Never stop asking questions!

And always stay curious!